REMARKS

The Examiner is thanked for his help in correcting the inventor's name on the application.

With entry of this amendment, claims 1-33 are active in this application. Claims 4 - 21 and 23 - 32 are allowed.

Objections to Claims 3 and 22

Claims 3 and 22 were objected to for being dependent upon a rejected base claim. Both were indicated to be allowable if rewritten in independent form including all the limitations of the base claim.

Responsive to this objection, claims 3 and 22 are each amended to independent form. The word "further" before "equipped" does not appear in the preambles of claims 3 and 22 as so amended. The word "further" before "equipped" is surplusage that might be misleading, and it has also been deleted from claim 1 as currently amended.

In amending claim 3 to independent form, the limitation "that recovers baseband digital television signals" in regard to "further digital television signal reception apparatus" is omitted to avoid indefiniteness. The only element positively recited as being included in the further digital television signal reception apparatus is "frequency-conversion apparatus for converting said further amplified response to said first intermediate-frequency signal received from the second end of said transmission line upward in frequency to generate a radio-frequency signal in a frequency range that can be detected by a broadcast digital television receiver". This frequency-conversion apparatus does not recover baseband digital television signals, but rather converts intermediate-frequency digital television signals upward in frequency. The "baseband digital television signals" will be recovered by the "broadcast digital television receiver" recited as a workpiece in the final paragraph of claim 3.

The patentability of claim 3 is presumably predicated on the frequency-conversion apparatus for converting said further amplified response to said first intermediate-frequency signal upward in frequency to generate a radio-frequency signal. If this be so, omission of the

limitation causing indefiniteness does not make claim 3 unpatentable, and allowance of claim 3 as currently amended is solicited.

Claim Rejections - 35 USC § 102

Claim 1 was rejected under 35 U.S.C. 102(b) as being anticipated by U. S. patent No. 4,145,720 (Weintraub *et alii*).

Lines 17-19 in column 3 of the Weintraub *et alii* patent specify the contents of FIG. 2 as follows. "FIG. 2 is a block diagram drawing of the internal circuitry of Model 1, E.G.R.C. for the remote control of television reception." Elsewhere in the patent "E.G.R.C." is indicated to be the initials for "electronic guided remote control device". Since FIG. 2 is indicated to be a block diagram drawing of the *internal* circuitry of the TV remote control device, this is ample evidence that all the elements shown in FIG. 2, except possibly the antennas, are packaged together as a single self-contained unit.

Claim 1 is amended to recite explicitly "said tuner contained in a package for installation proximate to said antenna and remote from any subsequent receiver apparatus". Claim 1 is amended to recite "said tuner separately packaged from said subsequent receiver apparatus which includes said further digital television signal reception apparatus and from apparatus for supplying remote control information". This distinguishes from the Fig. 2 TV remote controller of Weintraub *et alii* in which the tuner is packaged together with subsequent receiver apparatus.

Claim 1 calls for "a cable-driver amplifier". As pointed out previously, there is lack of any evidence of a cable-driver amplifier in the Fig. 2 TV remote controller of Weintraub *et alii.*

Claim 1 is amended to recite explicitly "said intermediate-frequency voltage amplifier and said cable-driver amplifier having respective bandwidths wide enough to amplify the entirety of said single selected one of said digital television signals". This distinguishes Applicant's apparatus from the Weintraub *et alii* Fig. 2 TV remote control device, which obviously uses the IF amplifier set-up for intercarrier-sound amalog TV receiver.

The rejection of claim 1 is apparently strongly based upon the incorrect notion that the IF amplifiers of a intercarrier-sound analog TV receiver like that of Weintraub *et alii* would be

appropriate for digital TV signals. Applicant's May 18 response to the final rejection provided evidence of what the bandwidth of the IF amplifier for an intercarrier-sound analog TV receiver is. Figs. 10 & 11 of U.S. Pat. No. 5,305,109 are further evidence that analog TV receiver designs using SAW filters roll off the video carrier 3 dB 1.25 MHz from channel edge. Attached is a copy of pages 59 & 60 of the current ATSC Digital Television Standard (A/53) as evidence of the bandwidth of the DTV signal.

Claim 1 requires "*electrically controlled* front-end circuitry having an input port equipped for connection to said antenna to receive said radio-frequency signals therefrom and having an output port". This contrasts with the Weintraub *et alii* Fig. 2 TV remote control device, which provides *manually controlled* front-end circuitry to the person exercising remote control.

Claim Rejections - 35 USC § 103

Claim 2 is rejected under 35 USC 103(a) as being unpatentable over U. S. patent No. 4,145,720 (Weintraub *et alii*) in view of U. S. patent No. 6,118,499 (Fang).

Claim 2 calls for "said tuner separately packaged from said further digital television signal reception apparatus and an apparatus for supplying remote control which are in combination with said tuner and said transmission line." The tuner is packaged together with subsequent receiver apparatus in the Fig. 2 TV remote controller of Weintraub *et alii*, which teaches away from this feature of Applicant's claim 2 invention.

The references do not show all the elements of the combination claimed in amended claim 2. There is no "transmission line several meters long" described in Weintraub *et alii* or in Fang. There is lack of any evidence of "a cable-driver amplifier" in the Fig. 2 TV remote controller of Weintraub *et alii*.

Claim 2 requires "*electrically controlled* front-end circuitry having an input port equipped for connection to said antenna to receive said radio-frequency signals therefrom and having an output port". This contrasts with the Weintraub *et alii* Fig. 2 TV remote control device, which provides *manually controlled* front-end circuitry to the person exercising remote control over a distant TV set.

Claim 2 is amended to call for "adaptive digital filtering connected for equalizing the channel for said baseband digital television signal and suppressing echoes therein" and "a symbol decoder connected for receiving said baseband digital television signal after equalization thereof and suppression of echoes therein". These elements are absent from the references.

Claim 2 is amended to recite explicitly "said intermediate-frequency voltage amplifier and said cable-driver amplifier having respective bandwidths wide enough to amplify the entirety of said single selected one of said digital television signals". This distinguishes Applicant's apparatus from the Weintraub *et alii* Fig. 2 TV remote control device.

General Remarks Concerning Patentability

The rejections fail to address the patentability of the invention considered as a whole. Applicant's invention concerns the antenna amplifier used for VHF and UHF broadcast television signals. The references are not concerned with antenna amplifiers nor the problems with the antenna amplifiers used in the prior art.

A basic concern in the digital TV art is the channel-equalization filtering that is necessary to suppress repeats in the digital signals. At the time Applicant made his invention, the problems with these repeats was generally attributed to multiple paths between the transmitter and receiver antennas. Someone had measured input impedances of DTV sets to determine whether they provided a 600-ohm match to antennas, and they did not at all input signal strengths. This led applicant to reformulate the problem of repeats posed to the channel-equalization filtering as being due, not only to multiple paths between the transmitter and receiver antennas, but also to echoes arising in the cable from receiving antenna to DTV receiver when the cable was not properly terminated. Applicant perceived that the echoes arising in the cable from receiving antenna to DTV receiver was a separable part of the overall problem that could be corrected, reducing the complexity of the time-domain spectrum that the channel-equalization filtering had to clean up. Applicant further perceived that converting the over-the-air VHF and UHF DTV broadcast signals to a common intermediate frequency would simplify the problem of properly terminating the cable from receiving antenna to DTV receiver. Applicant observed that electrical control of modern tuners facilitated remote control of tuners at the antenna site, so converting the

over-the-air VHF and UHF DTV broadcast signals to a common intermediate frequency was quite simple to implement.

Incidentally, applicant realized, putting the tuner at the antenna would eliminate an onerous task encountered in outdoor reception antenna installations at reception sites nearby a TV transmitter. Namely, the installation of suitable channel-strength reduction filters could be avoided. New claim 33 is added to address this aspect of invention more specifically.

The Weintraub *et alii* and Fang references offer no specific teaching about antenna amplifiers or the problems of echoes arising in the cable from receiving antenna to DTV receiver. The references left a huge conceptual gap to be crossed in order to arrive at applicant's claim 1 and claim 2 inventions, a gap requiring more than ordinary skill in the art to cross.

It is fundamental patent law that the question of patentability should be approached prospectively from the viewpoint of the problem solver who does not yet have the solution in hand. It should not be approached retrospectively, reverse engineering from a novel solution originated by the applicant for patent. The relevant art is normally discovered by conducting a back search from that solution. But the fact that the solution is easy to understand once it is disclosed or the fact that it takes advantage of well-established principles are not the criteria for determining patentability.

After a search for relevant art has been completed, the Examiner should apply the correct criteria for determining patentability. As Judge Learned Hand instructed in **Traitel Marble Co. v. U.T. Hungerford Brass & Copper Co.**, 18 F.2d 66, 68 (CCA2 (NY) 1927):

"Assuming, for argument, that the law is absolute that there can be no patent for the new use of an old thing, that is because the statute allows no monopolies merely for ideas or discoveries. If the thing itself be new, very slight structural changes may be enough to support a patent, when they presuppose a use not discoverable without inventive imagination. We are to judge such devices, not by the mere innovation in their form or material, but by the purpose which dictated them and discovered their function."

It is inventive skill resulting in practical utility that the Congress seeks to reward. Part of inventive skill is the capability to formulate or to re-formulate the inventive problem to permit a

solution that is new or markedly improved. It is exasperating that the Examiner apparently will not consider the purpose which dictated applicant's tunable antenna amplifier and discovered its function in reducing the complexity of the time-domain spectrum that the channel-equalization filtering in the DTV receiver has to clean up. This is the central issue in determining whether or not claims 1 and 2 are patentable.

Respectfully submitted,

Allen Le Roy Limberg
Reg. No. 27,211
(941)-624-4302

July 10, 2006

Attachments: pp. 59 & 60 of "ATSC Digital Television Standard dated 18 Apr. 2006
TIFF image PP. 1, 10, 13, 22 of USPAT 5,305,109

Doc. A/53E
27 December 2005
Amendment No. 1 dated 18 April 2006

ATSC Digital Television Standard (A/53) Revision E, with Amendment No. 1

Advanced Television Systems Committee
1750 K Street, N.W.
Suite 1200
Washington, D.C. 20006
www.atsc.org

187 data bytes + 20 RS parity bytes = 207 bytes

207 bytes x 8 bits/byte = 1656 bits

Two-thirds rate trellis coding requires 3/2 x 1656 bits = 2484 bits.

The exact symbol rate is given by Equation 1 below:

$$(1)\ S_r\ (MHz) = 4.5/286 \times 684 = 10.76... \text{ MHz}$$

The frequency of a Data Segment is given in Equation 2 below:

$$(2)\ fseg = S_r / 832 = 12.94... \times 10^3 \text{ Data Segments/s.}$$

The Data Frame rate is given by Equation (3) below:

$$(3)\ f_{frame} = f_{seg}/626 = 20.66 ... \text{ frames/s.}$$

The symbol rate S_r and the transport rate T_r (see Section 7.2 of Annex C) shall be locked to each other in frequency.

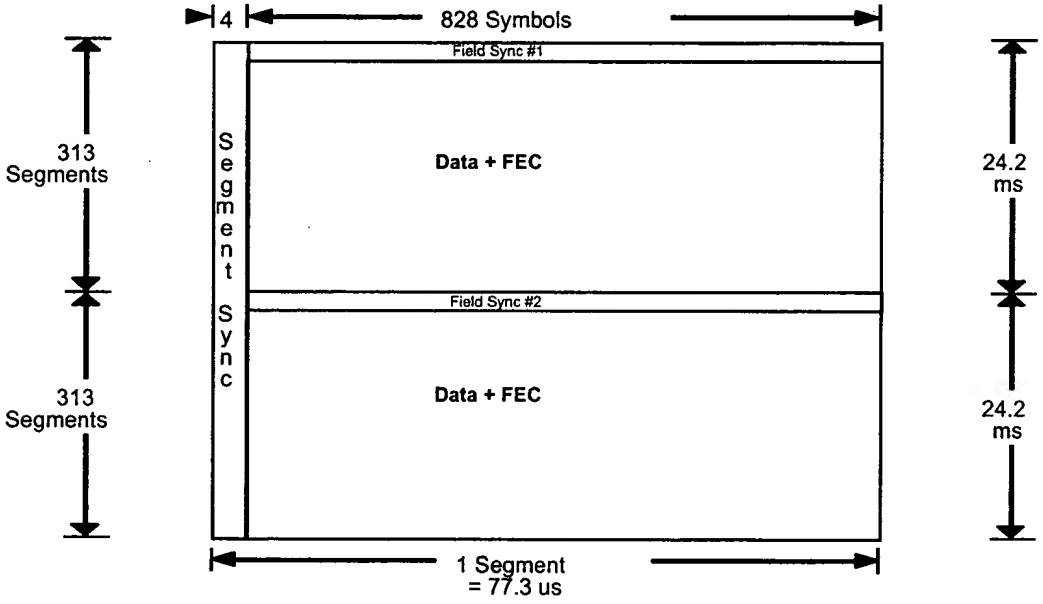

Figure D5.3 VSB data frame without extra field sync.

The 8-level symbols combined with the binary Data Segment Sync and Data Field Sync signals shall be used to suppressed-carrier modulate a single carrier. Before transmission, however, most of the lower sideband shall be removed. The resulting spectrum is flat, except for the band edges where a nominal square root raised cosine response results in 620 kHz transition regions. The nominal VSB transmission spectrum is shown in Figure D5.4.

At the suppressed-carrier frequency, 310 kHz from the nominal lower band edge, a small pilot shall be added to the signal.

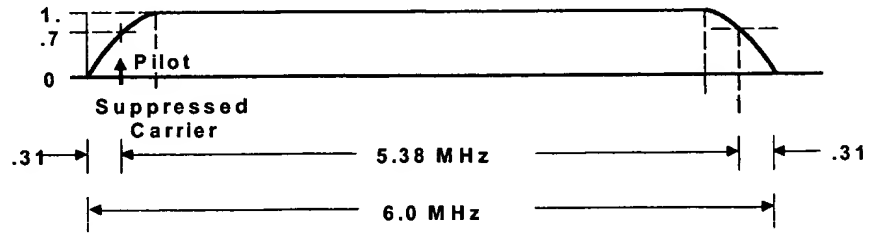

Figure D5.4 VSB channel occupancy (nominal).

5.4 Channel Error Protection

Main channel error protection consists of a concatenated RS encoding, interleaving and 4-state trellis encoding for the Main Service.

As an option, Enhanced modes may be employed. There are two modes available, with choice of levels of error protection within each method defined. These Enhanced modes provide methods to trade off data rate from the Main Service to facilitate reception. For a particular mode choice, the data rate assigned to the mode is variable in pre-defined steps.

There is a set of methods for adding additional forward error correction coding layers to the data before sending the data via a constrained version of 8-VSB. This method is called Enhanced 8-VSB. Various coding rate options are defined, and the payload assignment between the Enhanced 8-VSB data and the Main data is selectable at defined values.

The Main Service channel error protection is specified first, followed by the Enhanced mode.

5.4.1 Main Service Data Error Detection and Correction Facility

5.4.1.1 Main Service Data Randomizer

A data randomizer shall be used on all input data (including an Enhanced stream if present) to randomize the data payload. The data randomizer XORs all the incoming data bytes with a 16-bit maximum length pseudo random binary sequence (PRBS) which is initialized at the beginning of the Data Field. The PRBS is generated in a 16-bit shift register that has 9 feedback taps. Eight of the shift register outputs are selected as the fixed randomizing byte, where each bit from this byte is used to individually XOR the corresponding input data bit. The data bits are XORed MSB to MSB ... LSB to LSB.

The randomizer generator polynomial is as follows:

$$G_{(16)} = X^{16} + X^{13} + X^{12} + X^{11} + X^{7} + X^{6} + X^{3} + X + 1$$

The initialization (pre-load) to F180 hex (load to 1) occurs during the Data Segment Sync interval prior to the first Data Segment.

The randomizer generator polynomial and initialization is shown in Figure D5.5.